FNAL Cryocooler SQUID Test Stand

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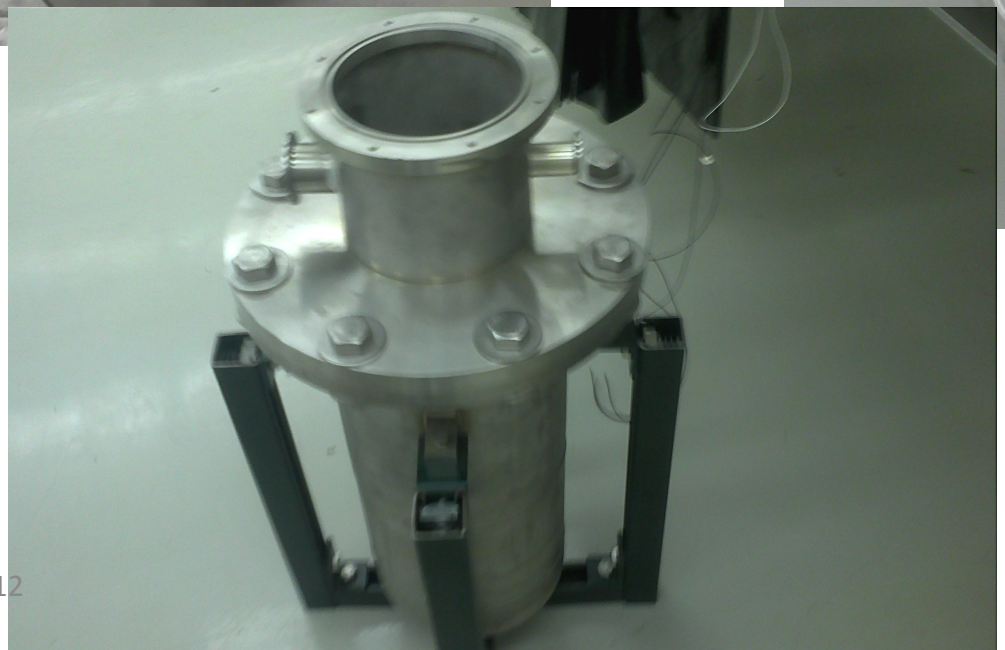
Concept

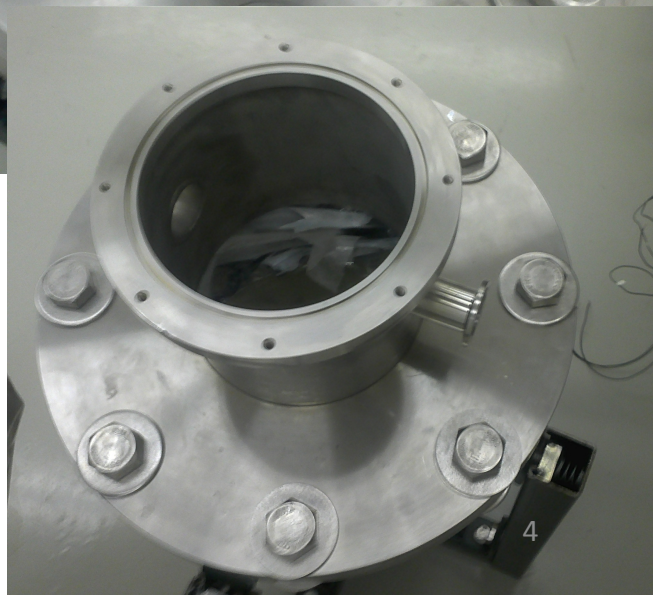
- We are developing a feedthrough concept for SCDMS
- I had originally asked Rich for a setup to leak test the feedthrough
- Dan asked me to look at using the cryocooler setup at Lab 3 to extend my leak check concept to a more useful cold electronics, and associated software, testing setup

Hardware Needed

- The feedthrough we are designing fits an ISO-K 200 flange, so we will need an ISO-K 200 nipple penetrating the vacuum vessel and an ISO-K 200 blank flange
- The cabling options will need to feedthrough the 77K shield, the cable will also need to be thermally coupled to the first stage of the cryocooler
- We need a mounting fixture for the cold hardware on the cryocooler second stage
- May want to introduce dielectric breaks to electrically isolate the cold electronics from the rest of the world

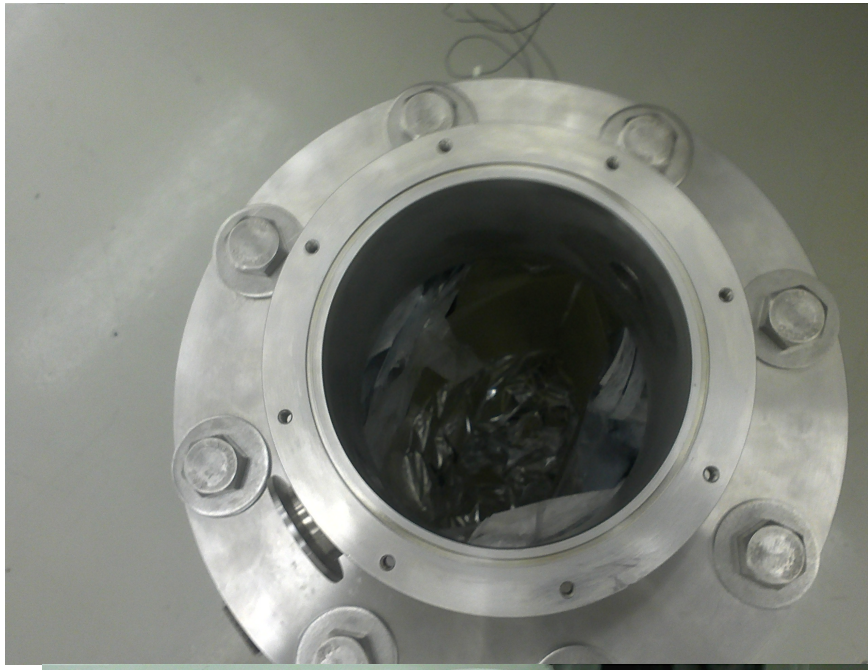
Outer Vacuum Vessel

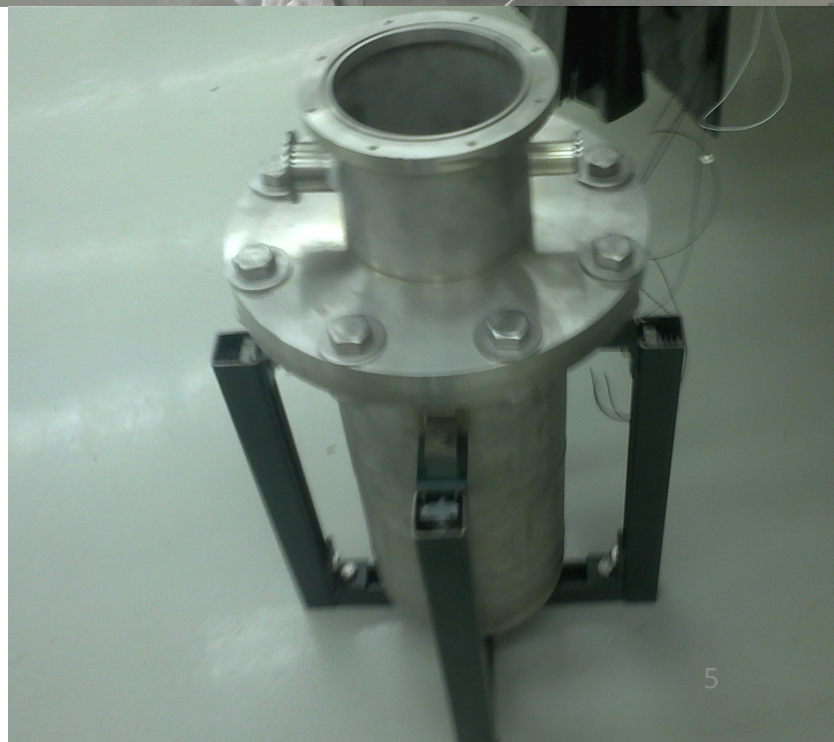




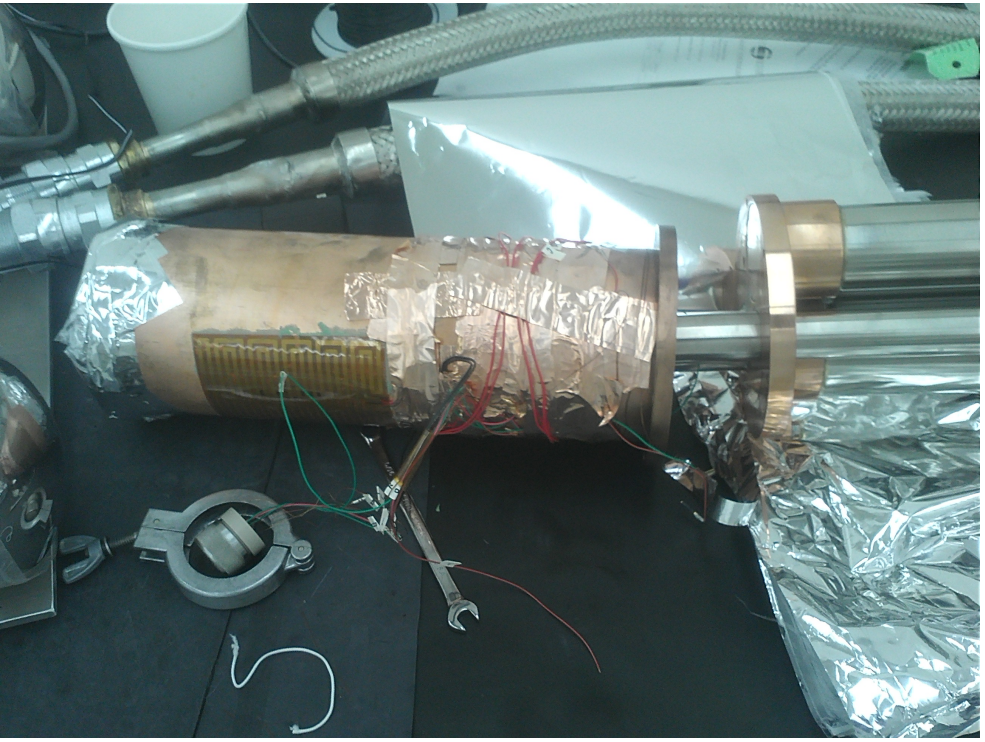
Outer Vacuum Vessel

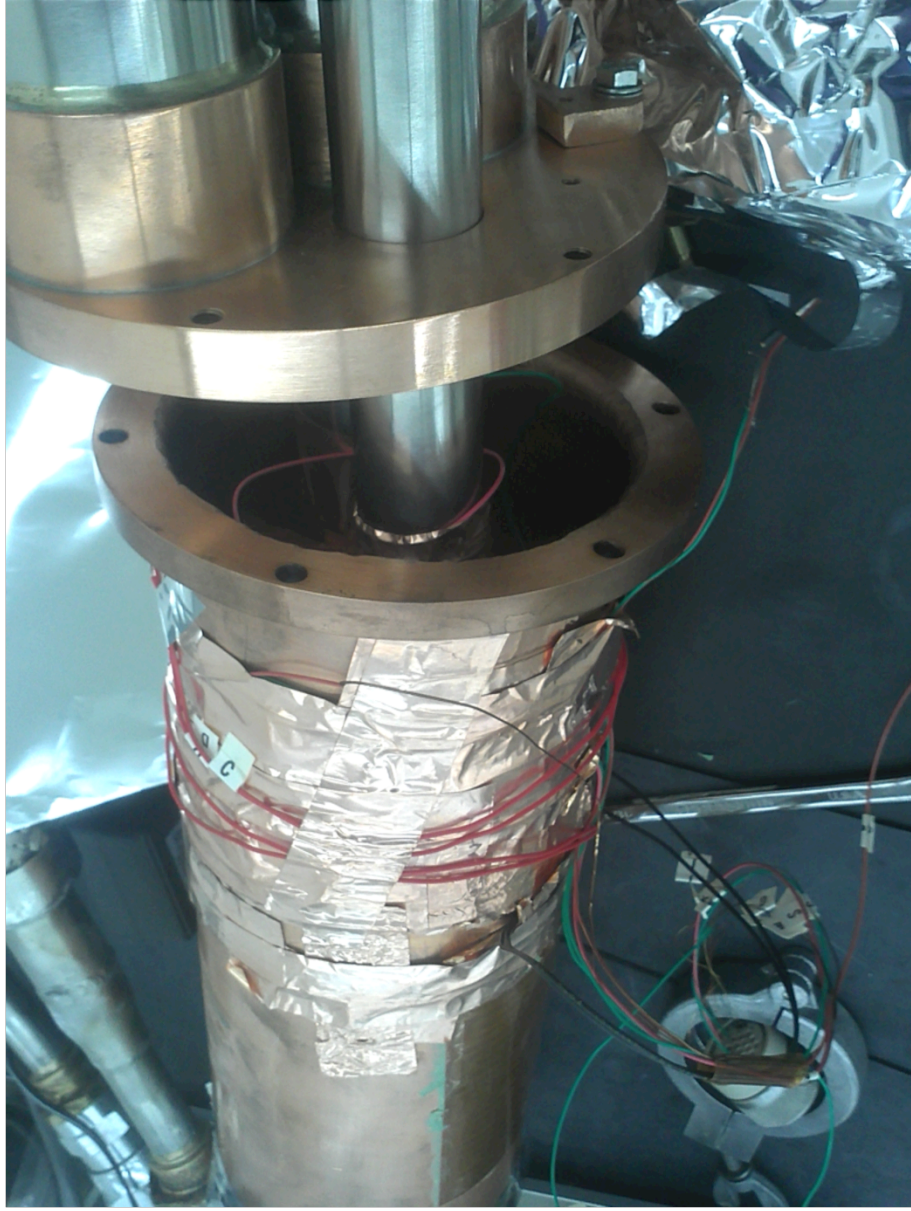
- We would like an ISO-K 200 flange for the feedthrough
- Cheapest option is probably to weld a half nipple on the side of the bottom piece
- Other options clearly exist, but will require significantly more metal and or mechanical support





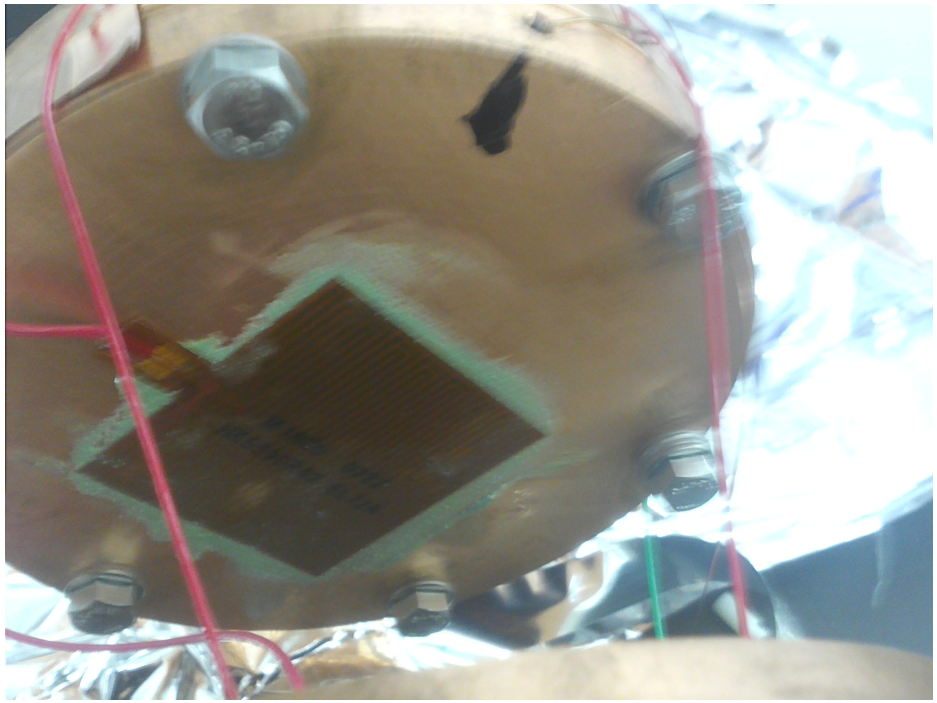
Inner Shield

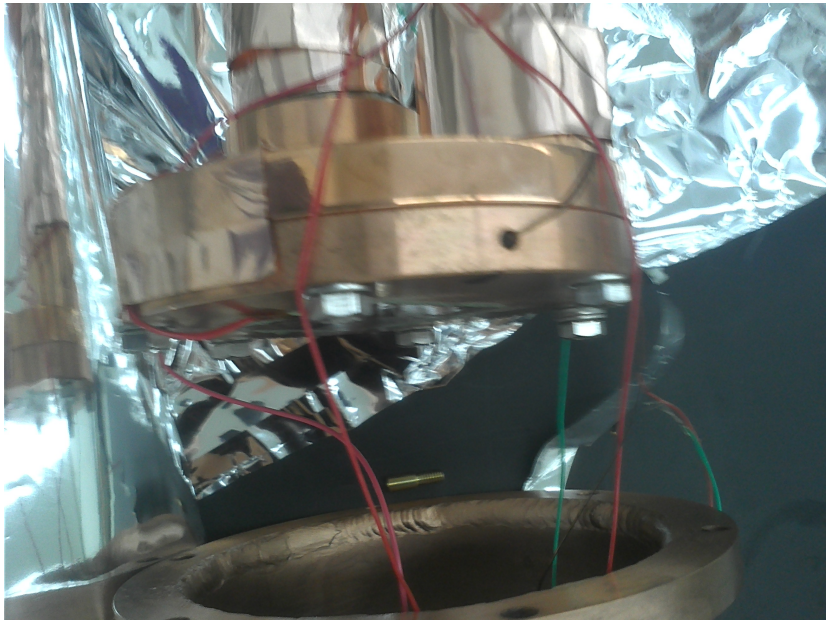




- Need to pass the cabling through the shield and thermally couple the cable to the first stage

Second Stage Cold Head





- Need to mount the cold electronics package to the second stage

Cold Hardware Details

- Probably want to start with the standard CDMS-II stripline and SQUET card package
  - Stripline html page with drawings: http://cdms.berkeley.edu/cdms_restricted/coldhardware/html/stripline.html
  - We can probably use a broken stripline if the discontinuous lines are acceptable
  - SQUET html page with drawings: http://cdms.berkeley.edu/cdms_restricted/coldhardware/html/squet.html
  - Various issues with SQUETs are probably ok, ie the ionization channels could be bad if we are focusing on SQUID work
- We will want to evolve with the evolution of the cold hardware for SuperCDMS-SNOLAB